

HEIGHT-ADJUSTABLE HINGE FOR A LIQUID CRYSTAL DISPLAY

1 BACKGROUND OF THE INVENTION

2 1. Field of the Invention

3 The present invention relates to a hinge, and more particularly to a hinge
4 which is able to provide height-adjustable feature to a liquid crystal display
5 (LCD) to provide more convenient observation alternatives.

6 2. Description of Related Art

7 As well known in the art, a hinge is provided between two objects so as
8 to provide a pivotal relationship between the two objects. Examples can be seen
9 everywhere in our lives. A common example is the LCD of a computer, wherein
10 the LCD pivots about a central axis so that various observation angles are
11 provided to different operators. However, in order to protect the LCD from
12 damage, the pivotal angle of the LCD is limited within a certain range. That is,
13 the pivotal movement of the LCD is stopped when the LCD is pivoted to a
14 critical angle. Consequently, if the operator is shorter than average or is a child,
15 the mere pivotal movement of the LCD can not provide satisfactory service to
16 meet the requirements.

17 To overcome the shortcomings, the present invention tends to provide an
18 improved hinge to mitigate the aforementioned problems.

19 SUMMARY OF THE INVENTION

20 The primary objective of the present invention is to provide an improved
21 hinge that not only enables the display to pivot but also allows the display to be
22 raised and lowered.

1 Another objective of the present invention is to provide a hinge having a
2 positioning device so that when the display is pivoted, the positioning device is
3 able to protect the display from damage through excessive travel.

4 Other objects, advantages and novel features of the invention will
5 become more apparent from the following detailed description when taken in
6 conjunction with the accompanying drawings.

7 **BRIEF DESCRIPTION OF THE DRAWINGS**

8 Fig. 1 is an exploded perspective view of the hinge of the present
9 invention;

10 Fig. 2 is a perspective view showing the hinge of the present invention in
11 assembly;

12 Figs. 3 and 4 are side views showing that the display attached to the
13 hinge of the present invention is raised and lowered by the use of the hinge;

14 Fig. 5 is a side view showing that the display is pivoted relative to a
15 fixture of the hinge of the present invention; and

16 Fig. 6 is a schematic view showing the application of the hinge to a back
17 of the display.

18 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

19 With reference to Fig. 1, the hinge in accordance with the present
20 invention includes a base (1), a first arm (2), a second arm (3), a fixing seat (4)
21 and a bracket (5).

22 The base (1) includes two upright walls (11) each with a first hole (15)
23 and a second hole (16) aligned with the first and second hole (15,16) of the other

1 upright wall (11) respectively, a shaft (12) securely sandwiched between the two
2 upright walls (11) and a fixing plate (13) integrally extending out between the
3 two upright walls (11) and having a fixing hole (131) defined therein. A saddle
4 (14) having two positioning recesses (141) is defined in a side face of each of the
5 two upright walls (11).

6 The first arm (2) is composed of two arms each having a first and a
7 second pivot hole (21,21') defined in two distal ends thereof and a bridge (22)
8 securely connecting the two arms together.

9 The second arm (3) is composed of two arms each having a first and a
10 second pivot hole (31,31') defined in two distal ends thereof and a bridge (32)
11 securely connecting the two arms together and defining in a side face thereof at
12 least one (two are shown in this preferred embodiment) connecting hole (33). A
13 limiting block (34) is formed on a side face of each of the two arms of the second
14 arm (3) to correspond to the saddle (14) of the base (1).

15 The fixing seat (4) has two pairs of through holes (41,41') defined in a
16 top portion and a bottom portion of the fixing seat (4) and two positioning
17 wedges (42) formed on a side face of the fixing seat (4) between the two pairs of
18 through holes (41,41').

19 The bracket (5) is elongated and has two extensions (51) extending out
20 from a distal end of the bracket (5) to correspond to the fixing seat (4).

21 With reference to Fig. 2 and still using Fig. 1 for reference, when the
22 hinge of the present invention is in assembly, the two first pivot holes (21) of the
23 first arm (2) are aligned with the two first holes (15) of the two upright walls (11).

1 and then a retaining device such as screw and nut combination is used to secure
2 the engagement between the first arm and the base (1). The first pivot holes (31)
3 of the second arm (3) are aligned with the second holes (16) of the two upright
4 walls (11) and then a first washer assembly (7) is provided between the two arms
5 of the second arm (3) and a side face of each of the two upright walls (11) to
6 secure engagement between the second arm (3) and the base (1). After the
7 engagement between the first arm (2) and the base (1) and between the second
8 arm (3) and the base (1), it is noted that the first arm (2) and the second arm (3)
9 are pivotal relative to the base (1).

10 Thereafter, at least one (two are shown) spring (6) is provided and has a
11 first end thereof connected to the connecting hole (33) of the second arm (3) and
12 a second end thereof connected to the fixing hole (131) of the fixing plate (13) of
13 the base (1). Then, the second pivot holes (21') of the first arm (2) are aligned
14 with the first pair of through holes (41) of the fixing seat (4) and the second pivot
15 holes (31') of the second arm (3) are aligned with the second pair of through
16 holes (41') of the fixing seat (4). A retaining device such as a screw and a nut
17 combination is used to secure engagement between the fixing seat (4) and the
18 first arm (2) and the engagement between the fixing seat (4) and the second arm
19 (3). After the engagement between the first and second arms (2,3) and the fixing
20 seat (4), it is learned that the first and second arm (2,3) is pivotal relative to the
21 fixing seat (4). Then a second washer assembly (8) is applied to secure
22 engagement between the fixing seat (4) and the bracket (5). That is, a bolt is
23 extended through a side face of the fixing seat (4) and a side face of the extension

1 (51) and into a series of washers. Eventually, a nut is provided to secure the
2 engagement between the fixing seat (4) and the bracket (5). Due to the provision
3 of a stop (81) formed on one of the washers and corresponding to the positioning
4 wedges (42), pivotal movement of the second washer assembly (8) is limited.

5 With reference to Figs. 3 and 4, it is noted that the first arm (2) and the
6 second arm (3) are arranged in parallel and the first arm (2) is on top of the
7 second arm (3). When a display (A) securely attached to the bracket (5) is about
8 to be moved upward or downward, due to the pivotal engagement between the
9 bracket (5) and the fixing seat (4) and the pivotal engagement of the first and
10 second arm (2,3) with the base (1), the bracket (5) together with the display (A)
11 is able to be moved to different latitudes. Besides, when the display (A) is moved
12 downward, the spring (6) is extended so that when the display (A) is about to be
13 moved upward, the recovery force stored in the spring (6) is released, which
14 helps the operator use less effort to move the display (A) upward. Still, when the
15 display (A) is moved upward and downward, the limiting block (34) moves back
16 and forth in the positioning recesses (141) of the saddle (14).

17 With reference to Fig. 5, again, because the bracket (5) is pivotally
18 connected to the fixing seat (4), the bracket (5) together with the display (A) is
19 able to pivot relative to the fixing seat (4) such that the display (A) is able to have
20 angle adjustment ability. While the display (A) angle is being adjusted, the stop
21 (81) moves between the two positioning wedges (42), which limits the angle
22 adjustment of the display (A) so that the display (A) is protected from damage.

23 With reference to Fig. 6, it is noted that when the hinge of the present

1 invention is in application to support the display (A), the base (1) is securely
2 mounted on a support (not numbered and shown in dotted lines). The hinge has,
3 in total, one bracket (5), two fixing seats (4) pivotally connected to two distal
4 ends of the bracket (5), two first arms (2), two second arms (3), and two bases (1)
5 respectively and pivotally connected to one first arm (2) and one second arm (3).
6 Furthermore, the quantity of the spring (6) that is provided between the second
7 arm (3) and the base (1) can be increased to two. The first washer assembly (7)
8 may be sandwiched only by one upright wall (11) and one side face of the second
9 arm (3). The second washer assembly (8) may be provided on only one side face
10 of the fixing seat (4) to provide the necessary friction to support the display (A)
11 attached to the bracket (5).

12 It is to be understood, however, that even though numerous
13 characteristics and advantages of the present invention have been set forth in the
14 foregoing description, together with details of the structure and function of the
15 invention, the disclosure is illustrative only, and changes may be made in detail,
16 especially in matters of shape, size, and arrangement of parts within the
17 principles of the invention to the full extent indicated by the broad general
18 meaning of the terms in which the appended claims are expressed.